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WHAT IS CLAIMED IS:

- 1 1. A drive unit for an electric vehicle, comprising:
2 a motor;
3 an inverter supplying alternating current electric
4 power to the motor;
5 a speed reducer reducing a revolution speed of a
6 mechanical output of the motor;
7 first refrigerant receiving heat of at least one of
8 the motor and the inverter and outputting the heat into
9 the atmosphere;
10 second refrigerant receiving heat of at least one of
11 the motor and the speed reducer and outputting the heat
12 to the first refrigerant, a cooling performance of the
13 first refrigerant being higher than a cooling performance
14 of the second refrigerant; and
15 a heat exchanger transferring the heat of the second
16 refrigerant to the first refrigerant.
- 1 2. The drive unit as claimed in claim 1, wherein the
2 motor, the inverter and the speed reducer are aligned on
3 an axis, the first refrigerant cooling the inverter, and
4 the second refrigerant cooling at least one of the motor
5 and the speed reducer.
- 1 3. The drive unit as claimed in claim 1, wherein the
2 motor, the inverter and the speed reducer are aligned on
3 an axis, the first refrigerant cooling the inverter, and
4 the second refrigerant cooling the motor and the speed
5 reducer.
- 1 4. The drive unit as claimed in claim 1, wherein the
2 motor, the inverter and the speed reducer are aligned on

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3 an axis, the first refrigerant cooling a stator coil of
4 the motor and the inverter, and the second refrigerant
5 cooling a motor shaft of the motor and the speed reducer.

1 5. The drive unit as claimed in claim 1, wherein the
2 motor and the speed reducer are aligned on an axis, the
3 inverter being disposed in parallel with the motor, the
4 first refrigerant cooling the inverter, and the second
5 refrigerant cooling the motor.

1 6. The drive unit as claimed in claim 1, wherein the
2 motor and the speed reducer are aligned on an axis, the
3 inverter being disposed in parallel with the motor, the
4 first refrigerant cooling a stator coil of the motor and
5 the inverter, and the second refrigerant cooling at least
6 one of a motor shaft of the motor and the speed reducer.

1 7. The drive unit as claimed in claim 1, wherein the
2 motor and the speed reducer are aligned on an axis, the
3 inverter being disposed in parallel with the motor, the
4 first refrigerant cooling the inverter, and the second
5 refrigerant cooling the motor and the speed reducer.

1 8. The drive unit as claimed in claim 1, further
2 comprising a heat radiating section disposed outside of
3 the structural member, the heat radiating section
4 radiating the heat of the first refrigerant into the
5 atmosphere.

1 9. The drive unit as claimed in claim 1, wherein the
2 heat exchanger is integrally assembled with the motor,

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3 the inverter and the speed reducer through a structural
4 member.

1 10. The drive unit as claimed in claim 1, wherein the
2 heat exchanger is integrally assembled at a lower portion
3 of the motor and the speed reducer through a structural
4 member.

1 11. The drive unit as claimed in claim 9, wherein the
2 heat exchanger is disposed in at least one of four
3 corners of an imaginary rectangle circumscribed with an
4 outer peripheral circle of the motor.

1 12. The drive unit as claimed in claim 1, wherein the
2 heat exchanger is disposed between the motor and the
3 inverter and is aligned with the motor and the inverter.

1 13. The drive unit as claimed in claim 12, wherein the
2 heat exchanger functions as a structural member.

1 14. The drive unit as claimed in claim 1, wherein the
2 motor is disposed adjacent to the speed reducer.

1 15. The drive unit as claimed in claim 1, wherein the
2 heat exchanger comprises a sump for receiving the second
3 refrigerant which has received heat of at least one of
4 the motor and the speed reducer, and a first refrigerant
5 passage which is in contact with the second refrigerant
6 in the sump and in which the first refrigerant flows.

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1 16. The drive unit as claimed in claim 1, wherein the
2 first refrigerant includes cooling water, and the second
3 refrigerant includes oil.

1 17. A drive unit for an electric vehicle, comprising:
2 a motor;
3 an inverter electrically connected to the motor, the
4 inverter supplying alternating current electric power to
5 the motor;
6 a speed reducer connected to the motor, the speed
7 reducer reducing a revolution speed of a mechanical
8 output of the motor; and
9 a cooling system comprising
10 a first refrigerant passage in contact with at
11 least one of the motor and the inverter,
12 a second refrigerant passage in contact with at
13 least one of the motor and the speed reducer,
14 a heat exchanger connected to the first
15 refrigerant passage and the second refrigerant
16 passage,
17 a radiating section connected to the first
18 refrigerant passage and the heat exchanger, the
19 radiating section radiating heat into the atmosphere,
20 first refrigerant circulating the first
21 refrigerant passage, the heat exchanger and the
22 radiating section, first refrigerant receiving heat
23 at the first refrigerant passage and the heat
24 exchanger and radiating the heat at the radiating
25 section,
26 second refrigerant circulating the second
27 refrigerant passage and the heat exchanger, the
28 second refrigerant receiving heat at the second

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29 refrigerant passage and radiating the heat at the
30 heat exchanger.

1 18. The drive unit as claimed in claim 16, wherein the
2 second refrigerant passage includes surfaces of gears of
3 the speed reducer.